

## CRASH CUSHIONS

Crash cushions are installed for the following reasons:

1. To satisfy safety requirements in the gore area clean up program.
2. To protect vehicles from a hazard which cannot be removed.
3. To protect vehicles from a temporary construction hazard.

There are two classes of crash cushions:

- A. Non-redirectional crash cushions that allow a vehicle to penetrate the array.
- B. Redirectional units that redirect a vehicle when hit on the side.
  1. Energy Absorption - Hex-Foam
  2. Energy Absorption - GREAT (GUARD RAIL ENERGY ABSORBING TERMINAL)

The Hex-Foam and GREAT units dissipate energy using dry frangible cartridge cells. Non-redirectional crash cushions use frangible plastic barrels filled with varying quantities of sand.

The Districts determine the type of crash cushion considering the following factors:

The accident history at an obstacle determines the need for a redirectional unit.

Maintenance costs are greater for sand barrels when repeated hits are recorded.

Sand barrels scatter debris when impacted and are not to be used on elevated structures where the debris could fall on occupied space below.

Some Districts prefer certain types of crash cushions to minimize parts inventory and simplify repair procedure.

Sand barrels are usually selected to be placed in front of wide fixed objects and at irregularly shaped sites.

Temporary crash cushions can be either sand barrel arrays or a GREAT (Construction Zone).

Supersedes Memo to Designers 14-14 dated September 1980

In general, the selection and layout of crash cushions should meet the following requirements. See Attachments A, B, C, D and E.

1. The gore needed to accommodate crash cushions is shown on Attachment A.
2. Array A for the sand barrels shown in Attachment B is designed for 65 MPH impacts (for automobiles in the 1800-4500 pound range). This is the minimum number of sand barrels for use in an installation on a freeway. Other arrays are needed at larger obstructions.
3. Hex-Foam crash cushions with 10 bays are minimum for freeways. (See Attachment D.) Eight (8) bay units are to be used only at sites where normal speeds are always reduced.
4. The GREAT should be used only for very narrow gore or site conditions. Current repair costs appear higher than similar costs for Hex-Foam crash cushions. Though ten bay GREAT crash cushions are preferred, eight bay units are the minimum for use on freeways. For other State Highways where speeds are reduced six bays may be used.
5. When the type selection is in question, the initial crash cushion installation shall be sand barrels. Gore space should be reserved to accommodate a possible Hex-Foam unit in the future.
6. Temporary crash cushions placement is further explained in Memo to Designers 14-19, Temporary Railing.

For policy, "Temporary" is usually defined as the time period during a project construction period. Other use may be for emergency situations or those requiring Headquarter's Traffic review.

Standard details, similar to Attachments D and E, are available from the Walls and Railings Staff Specialist.



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Attachments